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OPERATING CONTROLS

REVISION 2
25 APRIL 2006



The Hyperdigital System Controller Model Number CE-16-CMSU is designed to control :
2 off CC-21M/1410T Colour Cameras, 2 off CL-1215/LED Lights, 2 off CC620ZXS Cameras, 2
off CE-24/20LED Lights, 1 off CE-GC-04VP Gas Catcher and 1 off Tractor Unit CE-
TM04/220TR.

For use on Topside in a Control Room along with a Monitor.

POWER UP SYSTEM

The Topside Control Unit is supplied with a 3 pin 13 amp plug and has a Residual Current Device (RCD) installed inline. Once the plug is connected and powered, the RCD needs to be reset by pressing the green reset button. Thus power is supplied to the Topside Control Unit. This action will also power up the DV Recorder, DVD Recorder and Video Overlay Unit (press power button twice).

ON/OFF SWITCH

Once pressed, the On/Off Switch will illuminate red thus indicating the panel is active. The DV Recorder will display a blue screen with a cross in the centre. If there is no video signal, it will switch off and go into standby mode. Please read Appendix on CRT Monitor, DV Recorder and DVD Recorder along With Video Overlay.

MULTIPLEXER

There are five round push buttons (colored blue) labeled as follows: SELECT, CANCEL / 1, 2, 3 and 4. On initial power up, if the ROV Pod is connected and powered, the DV Screen will produce four pictures. To select any individual camera (1 of 4), press the appropriate numbered button thus displaying the selected camera view. In order to split the screen (2, 3 or 4-way), SELECT is pressed and held along with the appropriate numbered button. If the desired split screen arrangement does not appear then repeat the procedure until desired formation is achieved.

TRACTOR

The Tractor Unit is designed to a maximum of 37mm Umbilical that will carry the Centralizer and a high pressure Hose along with capabilities for 1 x Camera and 1 x Light. The Tractor Unit will be responsible for aiding the Jetting Head along with Centralizer to push down an 8" pipe with the aid of the Jet Head as it is being cleaned. Once it has reached the grill, the Tractor Unit will be able to pull back the Umbilical along with the Centralizer to its home position.

To operate the Tractor: if the 1st button on 2nd row down is pushed up, the Umbilical in the Tractor will retract and if the button is pushed down then the Umbilical will be fed. The Tractor Unit has been tested to be able to pull 100kgs before the belts will start slipping, however, it will hold 50kgs if left under tension. Both motors must be connected in order for the Tractor to function. **(DO NOT ATTEMPT TO PULL ON THE UMBILICAL WHILE THE UMBILICAL IS IN THE TRACTOR).**

For further details see Data Sheet attached.

LIGHTS

There are four individual LED Light Units, each positioned directly over a Camera. Each Light can be switched individually. Switching is achieved by pressing ON/OFF buttons (round, red, push type, numbered 1-4). Lights 1 and 2 are connected as shown in the Block Diagram Model No CL-1215/LED. (Do not plug in any other type of Light). These buttons will not illuminate when powered, however, they will stay pressed in while that particular light is switched on. To switch the light OFF, press the corresponding button again.

If electrical power cable 'Y' Splices are fitted to the lighting arrangement, eight individual lights can be used simultaneously, thus doubling the light output. Each light switch will now control two Light Units.

SENSORS

The Gas Catcher Valve Pack is controlled by the bottom row of switches. It has a safety feature incorporated utilizing a key switch so that it cannot be accidentally pressed thus charging the bottles with sea water instead of gas. In order to operate the Gas Catcher System, follow the three steps below :

Step 1

When ready to capture gas, turn the key to 'on' position. This will allow the user to activate the first two green buttons.

Step 2

Press the first green button (push and hold) marked 'open' for approximately 30 seconds. In this time the bottle will have been charged with gas.

Step 3

Once gas has been captured, press and hold green button number 2 marked 'closed'. Minimum time of 40 seconds to ensure the Gas Catcher valve is fully closed.

See Data Sheet for Gas Catcher.

DV RECORDER

This device will automatically be powered up when the Topside Control Unit is energized. When this happens, the unit will emit a chime and a blue screen will appear on the 4" LCD Screen. If there is no picture or the screen does not illuminate blue, switch ON the machine until a chime is heard and the LCD displays the 4 x Cameras. Once the video display is visible, the video information will be fed to the DVD Recorder and the 17" CRT Monitor.

For further details see Appendix 1, Operating Manual for DV Recorder.

DVD RECORDER

To power up the DVD Recorder, press the ON/OFF switch on the left hand side of the Units front panel. After a few seconds, press the OPEN / CLOSE disc tray button. The blue LCD on the front panel will display "SELF TEST" message. This routine will take approximately 15 seconds to complete. Once it has performed its self test procedure, the DVD tray will be extended. Press the slider button again, the DVD tray will retract and number 1 will be displayed on the blue LCD screen.

OPEN the right hand flip-down compartment, press CHANNEL SELECTION button down 5 times until the LCD display reads "A4".

Once the correct channel has been selected, the remote 17" CRT Monitor (if powered up) will display whatever is currently shown on the 4" LCD screen of the DV Recorder. The System is now ready to record the video information from the selected Cameras.

Only when the 4" LCD Screen of the DV Recorder has an image is it possible to record any video information on to the DVD Recorder hard drive. This also feeds the video / audio information on to 17" CRT Monitor.

VIDEO OVERLAY

See Data Sheet attached for operating controls.

On initial switch on press 'power' button twice.

CRT MONITOR

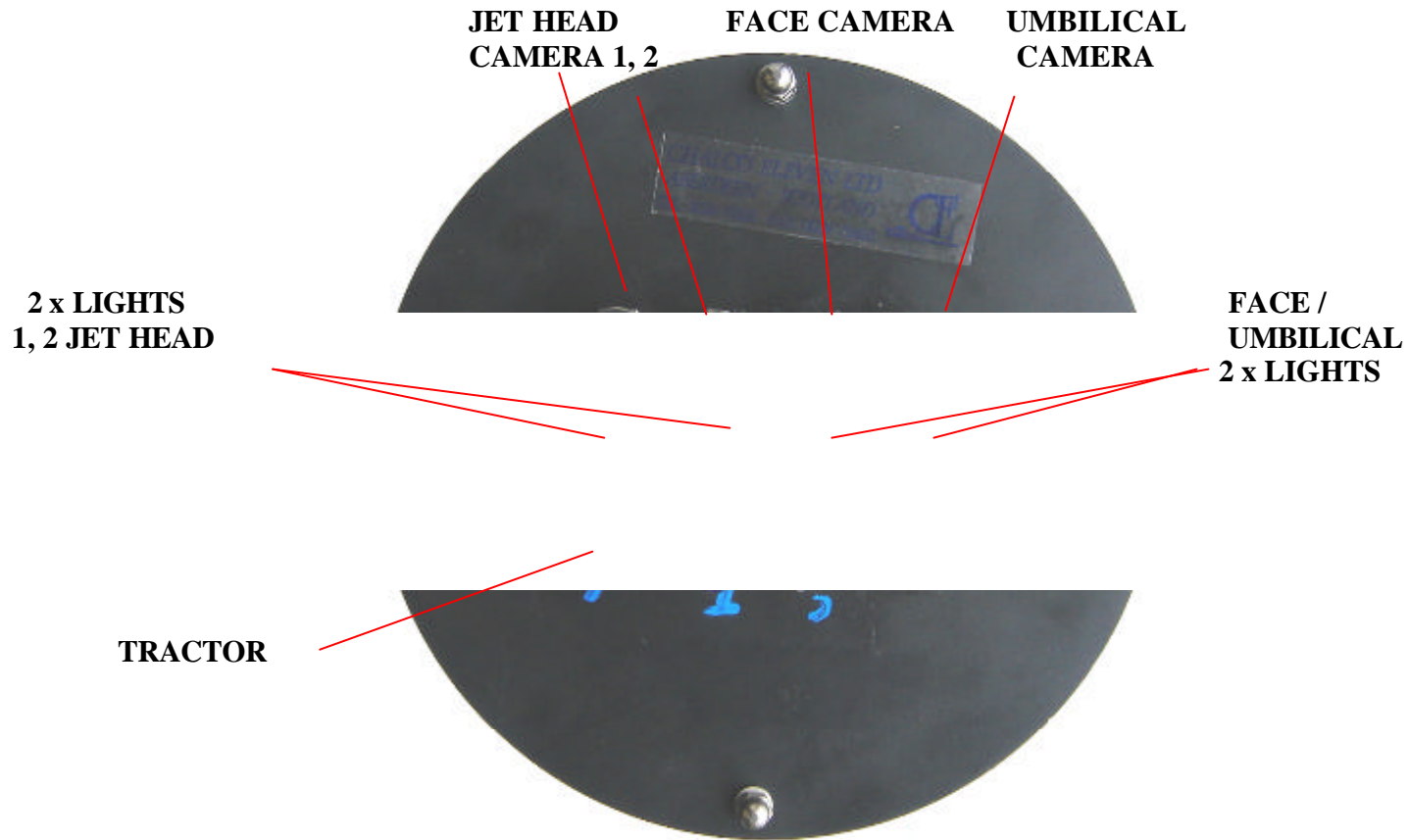
See Block Diagram in Section 6 for connection details. Once the CRT Monitor is connected, switch on the Monitor by pressing the silver round knob in the centre. The Monitor will start searching for video input. There are two video inputs that can be selected; (1) computer output, (2) the DVD output. The DVD output is composite video. The CRT Monitor will only produce a video output if there is signal from the DVD Recorder.

For further details see Appendix 5.

5.0

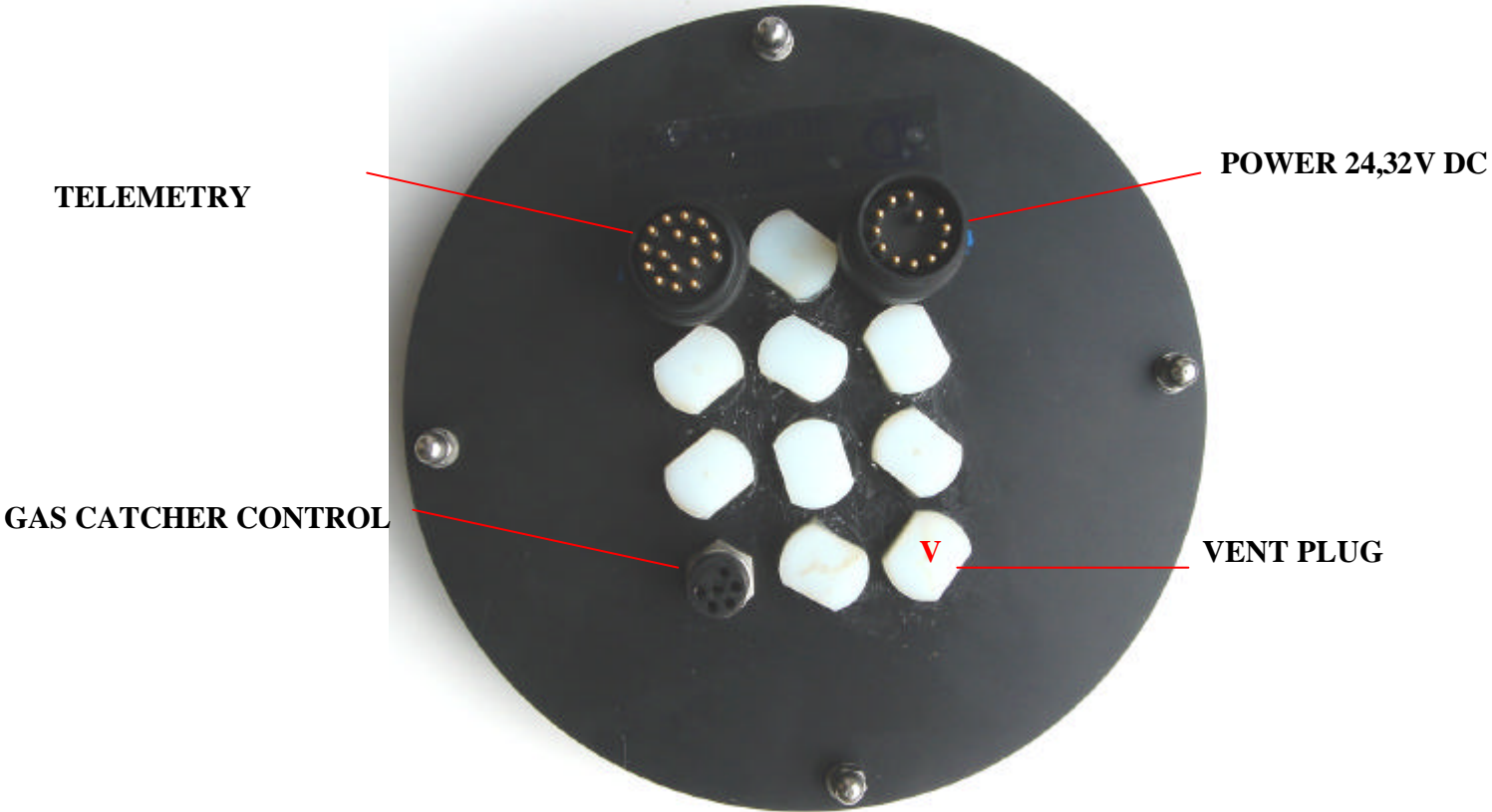
CONNECTING DETAILS

CONTROL PODSIDE A



JET HEAD CAMERA	4 PIN FEMALE PIN	(1=N/A)	(2=N/A)	(3=VIDEO+RED)	(4=VIDEO - GREEN)
GAS CATCHER	2 PIN FEMALE PIN	(1=BLACK 0V)	(2=WHITE 24V+)		
4 X LIGHTS	2 PIN FEMALE PIN	(1=BLACK 0V)	(2=WHITE 24V+)		
CAMERAS	6 PIN FEMALE PIN	(1=VIDEO SCREEN BLACK)	(2=VIDEO CORE WHITE)	(3=24V+RED)	(4=0V GREEN) (5, 6 =N/A)

CONTROL POD SIDE B



POWER 24VDC: 12 PIN MALE (1,2=N/A) (3=24V+POD) (4,11,12=0V) (5=32V+ TRACTOR) (6=0V) (7,8,9=N/A) (10,4,11,12 OF 16 WAY=0V)

GAS CATCHER CONTROL: 6 PIN FEMALE PIN (1=0V) (2=24V+ OPEN) (3=24V+CLOSE) (4,5,6 N/A)

TELEMETRY: 16 PIN MALE (1,2= N/A) (3=24V+LED) (4,11,12 =0V POD) (5+VIDEO 6-VIDEO) (7,8,=N/A) (9= +CONTROL) (10= -CONTROL) (13,14,15,16 N/A)

VENT PLUG: ONLY TO BE OPENED IF POD ACCESS REQUIRED

FRONT OF CONTROL RACK

SEE BELOW



DVD RECORDER
SELECT A4

DV
RECORDER

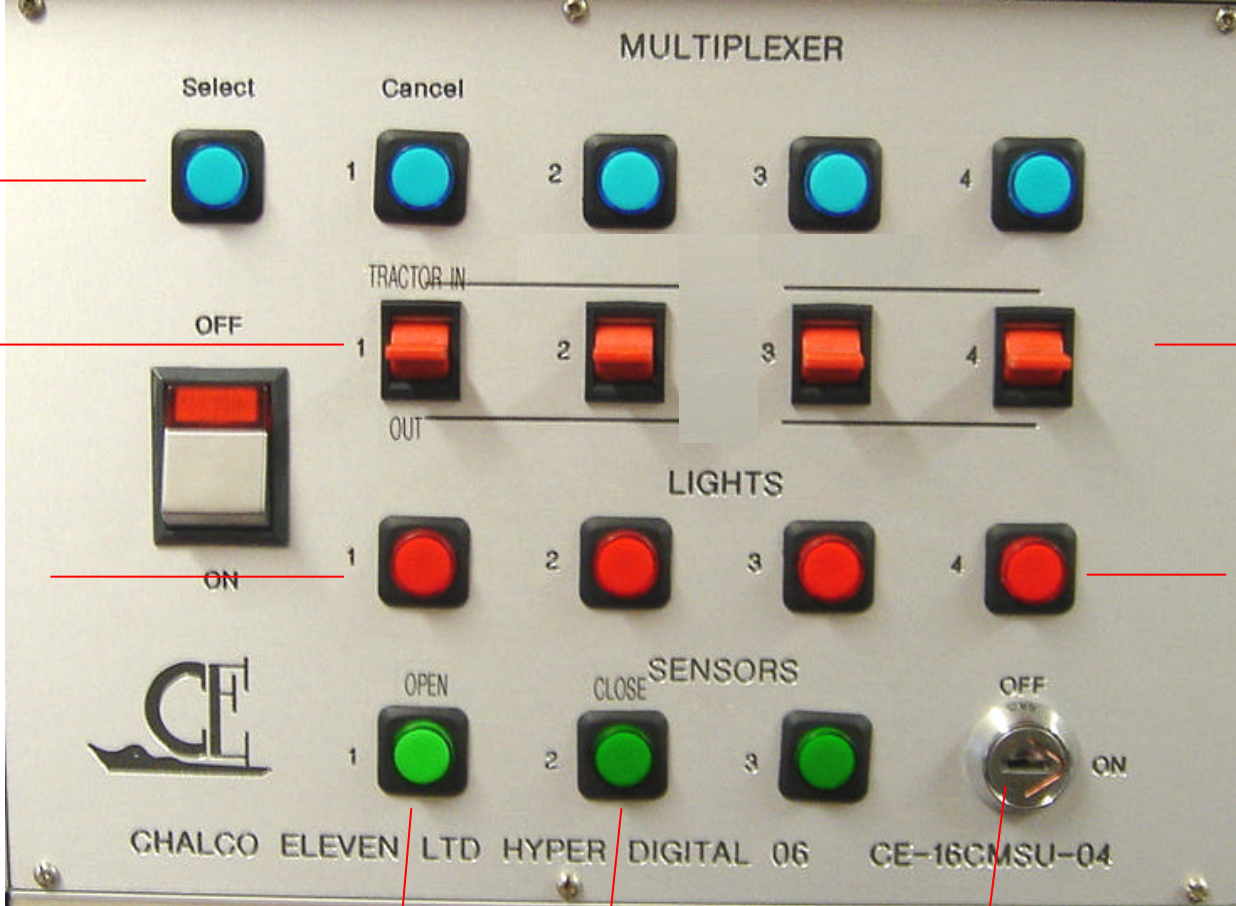
SLIDE OUT
VIDEO OVERLAY

CONTROL PANEL

**CAMERAS
DISPLAY**

TRACTOR

**JET HEAD 1, 2
LIGHTS**



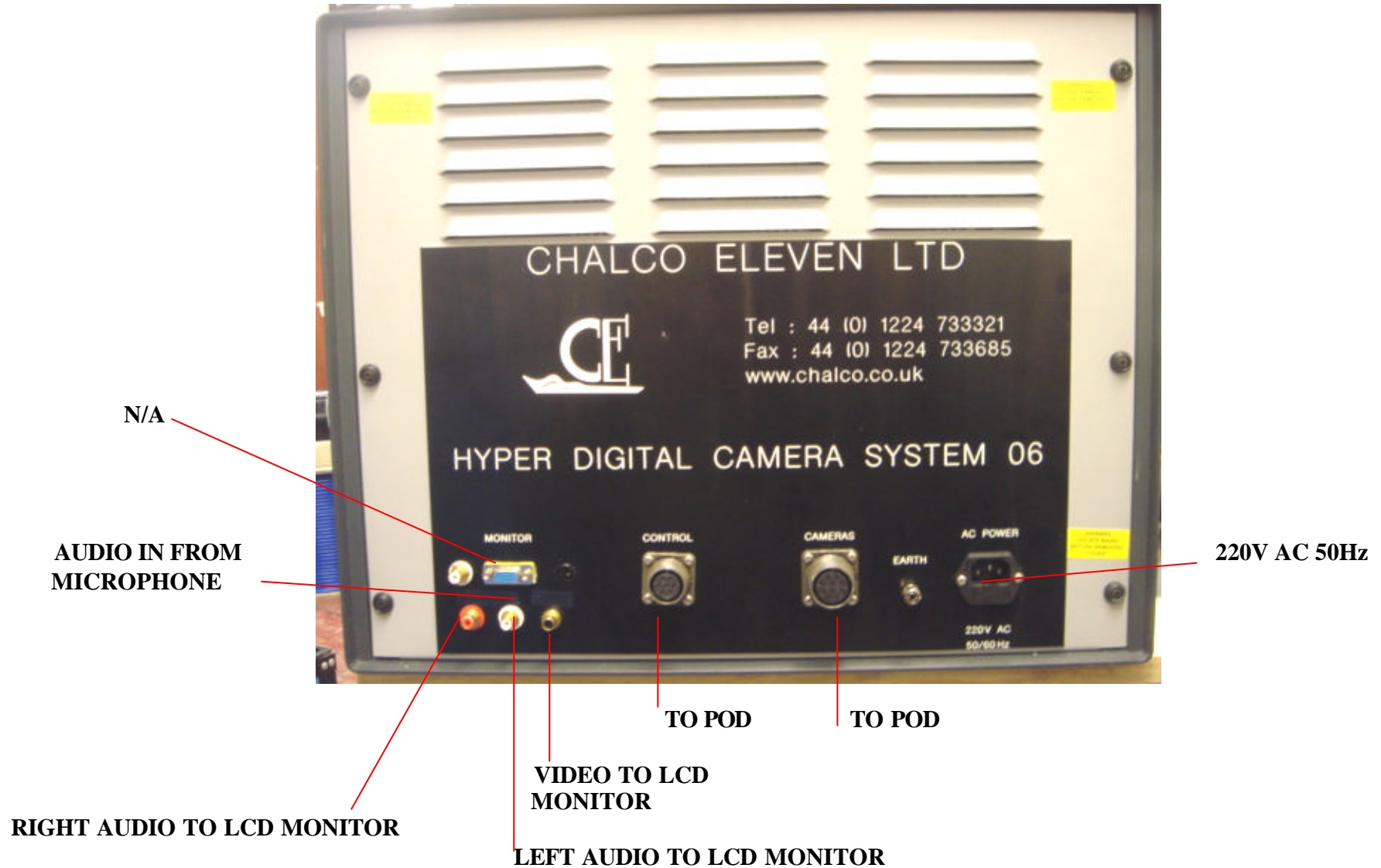
2, 3, 4 N/U

3, 4 LED LIGHTS

**GAS CATCHER
OPEN CLOSE SAFETY SWITCH**

Gas Catcher buttons are meant to be held pushed in to activate (open 30 seconds) (closed 40 seconds). These buttons can only be activated if key switch is in 'on' position.

BACK CONTROL RACK



Control 7 pins	(A+ B- Tractor Motors)	C and D = N/A	F = 24V+ Pod	G = 0V Pod	
Cameras 10 pins	A = 24V+ LED Lights I = Control	B- and C+ = Cameras J = 0V LED Lights	D and E = N/A	F and G = N/A	H+ = Control

6.0

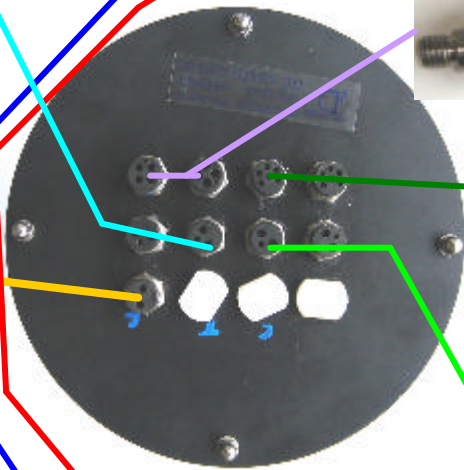
BLOCK DIAGRAMS

BACK

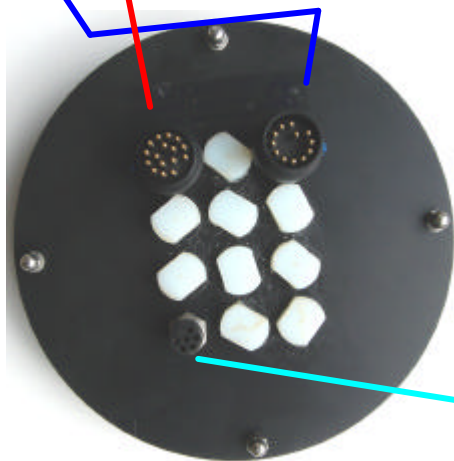
FRONT



MOTORS



2 x SUBSEA CAMERAS



2 x SUBSEA LIGHTS



VIDEO OVERLAY TMCC-3000



The Video Overlay TMCC-3000 is used to create video overlays on real-time or as part of an edit suite to overlay text in various fonts and background colours on to a VCR or on to a video information. There are various effects like transition, duration, scroll and crawl incorporated within the Unit. Real-time and date display features can be added to your real video pages and you can choose and define your own colours. Large blocks of text can be moved or copied without any typing. Pages may be played in many ways such as manually, backwards, automatically, repeating, etc. Play projects automatically at a specified date and time, which can be added to transparent background patterns and colours.

Video Overlay can also be used, once connected, as part of an editing suite. However, this will not affect the original

Overlays previously recorded. A page of titles can be created and recorded immediately. Then create the next page and record, but generally, it is more efficient to create a sequence of pages ahead of time. As production is recorded, you trigger (play) each page at the appropriate moment, displaying the page designed for that point in the production. Blank pages are added to the sequence anywhere the production calls for untitled video to be displayed.

These are just a few of the many things that the Video Overlay is capable of doing.

PROJECT

The memory of Video Overlay TMCC-3000 can be divided into any number of projects. Projects keep titles separate. One project can be modified without affecting others and text can be copied and moved between projects.

RAINBOW PATTERN

Pattern composed of colour gradients.

REAL TIME CLOCK

An effect in which a running clock/calendar is capable of being superimposed over all background possibilities, including line video.

RECORDER

VCR connected to TMCC-3000 output, used to record titles.

RESOLUTION

A measure of the ability to reproduce detail. Referred to as horizontal resolution and evaluated by establishing number of horizontal lines which are clearly discernible on a test pattern. In TMCC-3000 the term refers to the fineness of the characters and determines how smooth they are. TMCC-3000 has high resolution with a specification of 720 x 480 in NTSC or 720 x 580 in PAL (70 ns).

SCROLL

An effect in which a page of titles slides smoothly on to the screen from the bottom, continuing to slide up until all the titles slide off the top of the screen.

FADE

A fade is a transition effect in which the title fades away to leave the background or vice-versa.

MENU KEYS

The top row of keys on the TMCC-3000 used to display a menu.

FONT

The form and shapes of set characters.

SLIDE

Effect in which a page of titles slides on or off the screen in any four directions. A slide starts off the screen and stops when it is fully on the screen; or it starts on the screen and slides completely off.

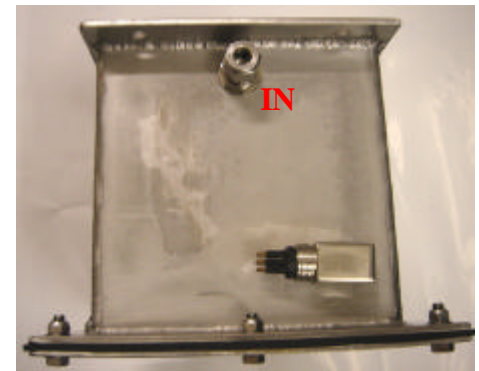
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GAS CATCHER CE-GC-04VP



Shown above is the Gas Catcher Valve Pack and its Controller. The Valve Pack is oil filled with AW32 and requires 24V DC @ 100mA.

On the side of the Pack is a 1 PSI over pressure Relief Valve. Input is on same side as the electrical connector and output is on the opposite side. Input and output fittings are Swagelok 3/8”.

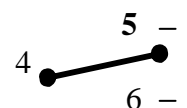
6 Pin Subconn Connector

Control

- Pin 1 : Black 0V common
- Pin 2 : White 24V+ to open
- Pin 3 : Red 24V+ to close

Indication

- Pin 4 : Green common
- Pin 5 : Orange close indication
- Pin 6 : Blue open indication



Controller Cores

- Pin 1 : Black 0V common
- Pin 2 : White 24V+ to open
- Pin 3 : Red 24V+ to close

- Pin 4 : Green common
- Pin 5 : Yellow close indication
- Pin 6 : Blue open indication

24V DC INCOMING Pin : 11 = 0V BLACK & Pin : 12 = 24VDC RED

DIVERS HAT MOUNT CAMERA CC620ZXS



The CC620ZXS is a high resolution Digital Colour Camera with 2 x Digital Zoom and is designed for harsh and unpredictable low light underwater use. The Camera has a depth rating of 1500ft MSW. The CC620ZXS is equipped with a specially developed circuitry by Chalco Eleven known as the electric eye.

The CC620ZXS's inbuilt electronic eye will monitor light levels and automatically adjust to the environment. The Camera will work down to 3 Lux producing clear, sharp images.

The Camera decides which light wavelength is the strongest and uses that to illuminate its image.

The maximum sensitivity of the CC620ZXS is 850nm wavelength. Due to its digital processing and the high scanning rate, the Camera is ideal for viewing objects in motion which is suitable for ROVs and mounting on the Divers Hat or hand held as an Inspection Camera. Blurring is totally eliminated. The CC620ZXS will produce high resolution colour pictures (greater than 450 TVL) even at very low light levels. The Camera is provided with a wide angle lens enabling the user to view a very large area with a single Camera without having to adjust any controls. The Camera has a fixed focus lens from 5 inches to infinity.

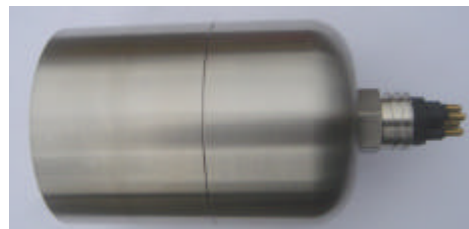
It should be noted that due to the very high performance of the CC620ZXS (a high resolution Digital Processing Colour Camera), a high resolution Colour Monitor (greater than 450 TVL) is required to match the performance of the Camera. The CC620ZXS comes in a PAL format although NTSC is optional.

The CC620ZXS Camera has a line driver built in for twisted pairs which is capable of delivering high quality colour video signal to a maximum of 1 kilometre on a continuous cable to a receiver at Topside.

CAMERA SPECIFICATIONS

1/4" ExView DSPCCD Chip
Better than 450 TV Lines
Electrical Auto Iris
Automatic White Balance Control
Colour and Monochrome
15 - 24V AC/DC @ 750 mA

Total Pixels 795H x 596V
Automatic Gain Control
Lens Angle 45°
Composite Video 1V p-p (modified)
65mm D x 90mm L ex connector (stainless steel)
Working Depth of 1500ft MSW



CC-21M/410T COLOUR CAMERA



The CC-21M/410T is a high resolution Digital Processing Colour Camera. It is designed to be used in confined spaces and is small enough to go through 22mm² aperture of the mesh. The Camera is very small so that it can penetrate and be pulled back through the mesh without getting snagged. It can also handle harsh and unpredictable environments. Its integrated lighting system allows the Camera to be used for low light underwater use. The Camera has a depth rating of 900ft SW.

The Camera produces a broadcasting quality video in PAL format (composite video 1v p/p @ 75Ω). The CC-21M/410T has a wide viewing angle (65° in air) and has fixed focus from 5” to infinity.

The CC-21M/410T has inbuilt electronic eye which will monitor light levels and automatically adjust to the environment. If the light levels fall below 0.4lux @ F2.0 the Camera decides which light wavelength is the strongest and uses that to illuminate its image.

The housing is manufactured from 316 stainless steel with a 4 pin titanium connector.

The CC-21M/410T performs best when used with the CL-1215/LED Subsea LED Light which also is 21mm x 75mm (without connector). It is manufactured from stainless steel 316 with a 2 pin titanium connector and produces an even light by its solid state technology. It has an average life of 50,000 hours and uses 100mA.

CAMERA SPECIFICATIONS

1/3" ExView CCD chip
Automatic Gain Control
Electronic Auto Iris
Auto-White Balance Control
0.4 lux Colour

Total Pixels 542 x 582
Working Depth of 900ft SW
6V DC @ 250 mA
21mm D x 90mm L
Weight in air 100g

4 PIN CONNTOR

Pin : 1 Screen
Pin : 2 Video
Pin : 3 6V+
Pin : 4 0V

CL-1215/LED SUBSEA LIGHT



The Subsea Light CL-1215/LED is a totally solid state which does not incorporate any halogen filaments that heat up and break. This light, once powered, can be illuminated in excess of 50,000 hours and can be knocked, bashed and moved about while illuminated. The housing is manufactured from 316 stainless steel with a 4 pin titanium connector.

The CL-1215/LED can withstand depths of 900ft SW and only measures 21mm OD x 75mm long without a connector. Can work of a variable voltage DC from 12-16V DC on the surface - subsea it can work of 12-26V DC. The CL-1215/LED has a beam angle that exceeds 90° subsea and 100° on the surface.

The CL-1215/LED produces an even light by its solid state technology and only uses 100mA to illuminate the way of the Diver or the Camera up to 3M plus in total darkness subsea or air. A diffuser is incorporated which eliminates hot spots on Camera Video.

LIGHT SPECIFICATIONS

Working Depth of 900ft SW
50,000 hours life
Solid State
12V DC @ 100 mA
21mm D x 90mm L
Weight in air 100g

2 PIN CONNTOR

Pin : 1 0V
Pin : 2 12-16V+

SUBSEA LIGHT CE-24/20LED



The Subsea Light CE-24/20LED is a totally solid state which does not incorporate any halogen filaments that heat up and break. This light, once powered, can be illuminated in excess of 50,000 hours and can be knocked, bashed and moved about while illuminated.

The CE-24/20LED is manufactured from Aluminium/Acrylic with a Stainless Steel Subsea Connector and can withstand depths of 1000M plus. It only measures 45mm x 30mm x 180mm excluding the connector and has a 90° wide beam angle which eliminates hot spots and red eye when used at close distance inspection via the CC720ZML HyperDigital Subsea Camera. It allows the user to light up a very large area in low visibility subsea. The light is evenly distributed rather than a concentrated beam.

The Light can be used with any Chalco Eleven Camera Controllers. The Light incorporates a subsea pluggable connector and operates from multiple supplies (this can be specified).

It has a specially designed circuitry which can withstand temperatures greater than 180°C although the Light is to be used underwater where it will regulate its own temperature. The Light can be used topside but it needs to be mounted on to a surface which can dissipate the heat. The front of the Light will not get hot at all.

Features

Type:	Subsea Light
Dimensions:	45mm x 30mm x 180mm
Weight:	520gm in Air
Connector:	2 pin plus guide underwater mateable
Input Voltage:	24-35VDC
Depth Rating:	1000M MSW
Material:	Aluminium/Acrylic
Power Output:	35+ Watts 90° Beam



FACTORY ACCEPTANCE TEST SHEET **FAT CE-TM04/220TR**

The Subsea Tractor CE-TM04/220TR had the following tests carried out at Chalco’s Base.

The objective of the Subsea Tractor is to be able to deploy/recover a Jetting Head along with Camera and Light moulded in to a pre-formed Centraliser in the Umbilical. The Umbilical incorporates a polyflex hose and video camera cable. The approximate OD is to be established, however, for this particular test we utilised the polyflex on its own which is 19mm OD.

The System is connected as it would be offshore but we only used a short interconnecting cable between the Tractor and the Topside Controller to perform the following tests :

Set-Up

- Fed through the 19mm polyflex hose through the Tractor.
- Made a fitting so that it screws in to one end of the hose.
- Secured that to the salter model 233, serial no 44580.
- Secured other end to a post and secured the Tractor to a separate post.

Test

By pressing the button on the Control Panel marked Tractor (in), this drew the Umbilical in to the Tractor thus tensioning the Umbilical. Then the same button was pressed down releasing the tension. This was repeated three times.

Then we reversed the Tractor and repeated the test from the other side.

Results

Once we tensioned the Tractor, on release, the scale read 50kgs and held. When the switch is pressed again for tension (pulled), we exceeded 100kgs before the belt s slipped.

BARRY-JOE EVERETT	J P KENNY CALEDONIA LTD	18 APRIL 2006
.....
Tests Witnessed By	Signature	Company	Date
ERIC MACDONALD	ACERGY UK LTD	18 APRIL 2006
.....
Tests Witnessed By	Signature	Company	Date
MAL BHATTI	CHALCO ELEVEN LTD	18 APRIL 2006
.....
Tests Conducted By	Signature	Company	Date